

VERSION WITH MARKINGS TO SHOW CHANGES MADE:

IN THE SPECIFICATION:

Paragraph [0019] has been amended as follows:

[0019] -- The air gap of the end pieces is formed in a further embodiment in such a way that the change in the magnetic force on the end pieces is continuous in the case of a relative movement of the primary and secondary parts. Because of the formation of the end pieces of the primary part in accordance with the invention, for each pole force contribution at the front side of the linear motor there is exactly one pole force contribution of equal and opposite magnitude at the rear side of the linear motor. The formed end pieces of the primary part are preferably ~~not~~ neither slotted and nor wound.--.

Paragraph [0033] has been amended as follows:

[0033] -- FIG. 2 shows an enlarged illustration of a detail of the side view of a linear motor, ~~and~~--.

Paragraph [0034] has been amended as follows:

[0034] -- FIGS. 3, 4 show arrangements of permanent magnets of the secondary part, and

FIG. 5 is an end view of a modified linear motor according to the present invention.--.

Paragraphs [0035] and [0036] have been amended as follows:

[0035] -- FIG. 1 shows a side view of a linear synchronous motor according to the invention, typically including a primary part 1 and a secondary part 6. For reasons of clarity, an illustration of poles 10 has been omitted in FIG. 1. The direction of movement of the linear motor is indicated by an arrow 5. The length of the primary part 1 in the movement direction 5 is shorter than the length of the secondary part 6. The primary part 1 includes a layered stack 8 of laminations 8 with primary ~~partial~~ part slots 9 which extend in parallel relationship for allowing placement of windings which are electrically excited by monophasic or polyphase alternating current. Prefabricated field coils have proved to be particularly easy to assemble in this case. In the exemplary embodiment according to FIG. 1, the longitudinal axes of the primary ~~partial~~ part slots 9 extend perpendicular to the longitudinal axis of the primary part 1, i.e. perpendicular to the movement direction 5. Skewed primary part slots 9 are also conceivable.--.

[0036] -- The stationary secondary part 6 includes a multiplicity of poles 10 which are arranged sequentially in the movement direction, with each one having a north pole 11 and a south pole 12. A narrow pole gap 13 of gap width P is located between the poles 10 which have each a width of W. In the exemplary embodiment according to FIG. 1 and FIG. 2, the longitudinal axes of the pole gaps 13 extend perpendicular to the longitudinal axis of the primary part 1, and are therefore orientated in the same way as the longitudinal axes of the primary ~~partial~~ part slots 9 according to FIG. 1. When the winding in a primary part 1 is

excited, a force is produced which moves the primary part 1, which, for example, is fastened under a slide, relative to the stationary secondary part 6. The speed of the primary part 1 is hereby synchronous with respect to the frequency of the two-phase or three-phase alternating voltage for exciting the primary part 1. This is the reason for designating this linear type as a linear synchronous motor.--

Paragraphs [0039] to [0041] have been amended as follows:

[0039] -- x_0 is the extent of the part 3 of the end piece 2 in the direction 5 of movement of the linear motor having a non-constant air gap,--;

[0040] -- y_0 is a height of the part 3 of the end piece 2 having a non-constant air gap at x_0 and,--;

[0041] -- $y(x)$ is the coordinate of the part 3 of the end piece 2 having a non-constant air gap at the point x .--.

Paragraph [0042] has been amended as follows:

[0042] -- The formed end pieces 2 may form a part of the stack 8 of laminations, but may also be attached as individual formed parts to the original stack 8 of laminations so that the stack of laminations can be fabricated in a conventional way with primary ~~partial~~ part slots 9 and windings, and subsequently provided with the end pieces 2. The orientation of the laminated arrangement preferably corresponds to the orientation of the stack 8 of laminations. The end formed pieces 2 are connected to the stack 8 of laminations in a non-positive or positive manner 4. FIG. 5 shows the end pieces 2 to include at least one partial stack of

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laminations made of ferromagnetic material and directed essentially perpendicular to the direction of movement 5 of the linear motor.--.

IN THE CLAIMS:

✓ **Cancel** claim 1 without prejudice.

Amend the following claims:

2. (Amended) A ~~The linear synchronous motor as claimed in claim 1,~~
~~characterized in that~~ comprising:

- a) at least one primary part (1) and at least one secondary part (6);
 - b) the secondary part (6) has a sequence of poles (10) formed by permanent magnets;
 - c) the length of the secondary part (6) is greater than the length of the primary part (1) in the movement direction (5).
 - d) the primary part (1) has primary part slots (9) which are suitable for holding monophasic or polyphasic windings.
 - e) the primary part (1) has means which lead to a change in the magnetic force in the movement direction (5) of the linear motor in the region of the end pieces (2) of the primary part (1). and
 - f) the end faces (14) of the end pieces (2) extend perpendicular to the movement direction (5) of the linear motor.
- wherein the air gap of the end pieces (2) is formed in such a way that a continuous change occurs in the magnetic force in the movement direction (5) of the linear motor in the region of the end pieces (2) of the primary part (1).

4. (Twice Amended) The linear synchronous motor as claimed in claim 4 2, characterized in that the gaps (13), located between the poles (10), of the secondary part (6) exhibit an angle (20) which differs from 90° with respect to the movement direction (5) of the linear motor.
5. (Twice Amended) The linear synchronous motor as claimed in claim 4 2, characterized in that the gaps (13) located between the poles (10) have a varying gap width (P).
6. (Twice Amended) The linear synchronous motor as claimed in claim 4 2, characterized in that the end pieces (2) include at least one partial stack of laminations made of ferromagnetic material, said laminations and directed essentially perpendicular to the direction of movement (5) of the linear motor.
7. (Twice Amended) The linear synchronous motor as claimed in claim 4 2, characterized in that the end pieces (2) are configured for attachment onto the primary part (1).
12. (Amended) The linear synchronous motor of claim 8, wherein the end pieces include at least one partial stack of laminations, which is made of ferromagnetic material, and said laminations directed essentially perpendicular to the direction of movement of the linear motor.

Add the following claims:

14. (New) The linear synchronous motor as claimed in claim 2, characterized in that the end pieces (2) of the primary part (1) are constructed in the absence of slots and without carrying a winding.
15. (New) The linear synchronous motor of claim 8, wherein each said end pieces is constructed in the absence of a slot and without carrying a winding.

IN THE DRAWING:

Add FIG. 5 as per copy enclosed.

REMARKS

The last Office Action of March 28, 2002 has been carefully considered. Reconsideration of the instant application in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 1 to 13 are pending in the application. Claim 1 has been canceled, Claims 2, 4, 5, 6, 7 and 12 have been amended. Claims 14 and 15 have been added. No fee is due.

It is noted that the declaration has been considered defective because of the Examiner's contention that the citizenship of the each inventor is not identified. Record is made of a telephone interview between applicant's representative and the Examiner which took place on April 30, 2002 to obtain clarification, because the required reference to the citizenship of each inventor is, in fact, set forth in the declaration, as filed. After further review, the Examiner confirmed that the Declaration, as filed, is indeed proper.

It is noted that the drawings are objected to because of applicant's failure to show the subject matter of claims 6 and 12. It is further noted that claims 6 and 12 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 2 and 8 stand rejected under 35 U.S.C. §102(b) as being anticipated by Japanese reference 09-074733 (hereinafter "Japan '733"), or

Japanese reference 05-103457 (hereinafter "Japan '457"). The Examiner is thanked for providing applicants with a translation of Japan '733 and Japan '457.

Claims 7 and 13 stand rejected under 35 U.S.C. §102(b) as being anticipated by Japan '457.

Claims 4 and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Japan '457 in view of U.S. Pat. No. 4,912,746 (hereinafter "Oishi").

Claims 5 and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Japan '457 in view of German Pat. No. 37 22 153 (hereinafter "German '153").

It is further noted that claims 6 and 12 have not been rejected on either 35 U.S.C. §102 or 35 U.S.C. §103.

It is noted with appreciation that claims 3 and 9 are indicated allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. However, applicants wish to defer amendments to these dependent claims in view of the arguments presented below regarding claims 1 and 8.

OBJECTION TO THE DRAWING

Applicant submits herewith a new Fig. 5 to show the subject matter of claims 6 and 12. The specification has been amended to make it consistent with the amendments to the drawing. No new matter has been added.

Withdrawal of the objection to the drawing is thus respectfully requested.

REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH

Applicants have amended claims 6 and 12 to clarify the positional relationship between the end pieces and the movement direction of the linear motor. Applicants assert that the amendments to claims 6 and 12 should not be considered a narrowing amendment to trigger prosecution history estoppel.

Withdrawal of the rejection of the claims 6 and 12 under 35 U.S.C. §112, second paragraph is thus respectfully requested.

REJECTION UNDER 35 U.S.C. §102(b) AND §103(a)

Applicants have canceled original claim 1 in favor of claim 2, which has been rewritten to include only those limitations of originally filed claim 2. Accordingly, applicant asserts that claim 2 has not been narrowed to trigger prosecution history estoppel. Claims 4, 5 and 7 have been amended to make them consistent with the rewritten form of claim 2 and cancellation of claim 1.

Independent claim 2 and independent claim 8 both are directed to a linear synchronous motor which is so configured that a steady change of the magnetic force is implemented in the movement direction of the linear motor in the region of the end pieces of the primary part.

Japan '733 describes the possibility for reducing the cyclic power variation in linear motors. Hereby the air gap at both ends of a primary part is enlarged by the yielding feature of both wound end zones of the primary part. Thus, the end zone must be specially wound and the cyclic power variation at the end of the primary part cannot be suppressed. In particular, Japan '733 fails to teach a continuous or steady change of the magnetic force from the wound part to the unwound part, as a consequence of the presence of an edge between the back part 8 and the curved part 9. In addition, unlike the present invention, which sets forth that the zone of non-constant air gap extends over a pole pitch, in Japan '733 this zone extends over several pole pitches.

Also Japan '457 also fails to teach a continuous or steady change of the magnetic force from the wound part to the unwound part.

For the reasons set forth above, it is applicant's contention that neither Japan '733 nor Japan '457 teaches or suggests the features of the present invention, as recited in claims 2 and 8.

As for the rejection of the retained dependent claims, these claims depend on claims 2 and 8, share their presumably allowable features, and therefore it is respectfully submitted that these claims should also be allowed.

Withdrawal of the rejection under 35 U.S.C. §§102(b) and 103(a) is thus respectfully requested.

CLARIFICATION AMENDMENT

Applicants have made amendments in the instant specification to change "primary partial slots 9" to --primary part slots 9-- to make clear that the slots are part of the primary part and to make the specification consistent with the claim language.

In addition, applicants have amended the specification with respect to a preferred embodiment, as set forth in paragraph [0019], to make clear that the term "not" in this context refers to "slotted" as well as "wound", so that the end pieces are neither slotted nor wound. Claims 14 and 15 have been added to expressly set forth this feature of the end pieces.

The changes to the instant specification are self-explanatory and do not contain any new matter.

CITED REFERENCES

Applicant has also carefully scrutinized the further cited prior art and finds it without any relevance to the newly submitted claims. It is thus felt that no specific discussion thereof is necessary.

CONCLUSION

Applicant believes that when the Examiner reconsiders the claims in the light of the above comments, he will agree that the invention is in no way properly met or anticipated or even suggested by any of the references however they are considered.

None of the references discloses a the combination for a linear synchronous motor, as set forth in claims 1 and 8, and especially none of the references teaches the formation of an air gap of the end pieces in such a way that a continuous change occurs in the magnetic force in the movement direction of the linear motor in the region of the end pieces of the primary part. In addition, none of the references discloses the combination of such a continuous change in the magnetic force and the provision of unwound end pieces, as set forth in claims 14 and 15.

In view of the above presented remarks and amendments, it is respectfully submitted that all claims on file should be considered patentably differentiated over the art and should be allowed.

Reconsideration and allowance of the present application are respectfully requested.

Should the Examiner consider necessary or desirable any formal changes anywhere in the specification, claims and/or drawing, then it is respectfully requested that such changes be made by Examiner's Amendment, if the Examiner feels this would facilitate passage of the case to issuance. If the

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Examiner feels that it might be helpful in advancing this case by calling the undersigned, applicant would greatly appreciate such a telephone interview.

Respectfully submitted,

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